



Review article

Chronic foot pain in older people

Hylton B. Menz

School of Allied Health, College of Science, Health and Engineering, La Trobe University, Bundoora, Victoria, Australia



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ABSTRACT

Foot pain is a common accompaniment of advancing age, affecting at least one in four older people. However, management of foot pain is a largely undervalued aspect of geriatric health care, resulting in many older people needlessly enduring chronic foot pain and related disability. The aim of this review is to provide an overview of (i) the prevalence and risk factors for foot pain, (ii) the impact of foot pain on mobility and quality of life, and (iii) the conservative management of foot pain. The available evidence indicates that although foot pain is common and disabling in older people, conservative interventions such as routine foot care, footwear advice and foot orthoses are effective at reducing foot pain and may also assist in maintaining mobility and independence in this age group.

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1. Introduction

The human foot plays an essential role in all weightbearing activities as it provides the only source of contact with the ground. When walking, the foot contributes to shock absorption, adapts to uneven surfaces, and facilitates the forward propulsion of the body. In the presence of foot pain, this important biomechanical function is disrupted, leading to impaired balance, difficulty ambulating and ultimately a loss of independence [1]. Despite this, management of

foot pain is a largely undervalued aspect of geriatric health care. Indeed, even older people themselves may consider foot pain to be an inevitable consequence of ageing rather than a treatable medical condition [2], resulting in many people needlessly enduring chronic foot pain and related disability.

The aim of this review paper is to provide an overview of the epidemiology, impact and conservative management of foot pain in older people.

2. Methods

A literature search was conducted in May 2016. The Ovid platform was used to explore Medline (1946 to present) and Embase

E-mail address: h.menz@latrobe.edu.au

(1974 to present) by applying the following title keyword search terms: foot OR foot problems OR foot disorders OR foot osteoarthritis AND elderly OR older; limited to human studies published as full journal articles in the English language. After the removal of duplicates; this search strategy yielded 194 documents. Following title and abstract review; 58 documents were removed; leaving a final yield of 136 manuscripts for consideration. The reference lists of these manuscripts were then examined for additional titles; and the most relevant manuscripts were selected for citation based on the predetermined subheadings of the review (epidemiology; impact and management). A narrative summary of the findings of these studies is provided.

3. Epidemiology of foot pain in older people

3.1. Prevalence

It has long been recognised that foot problems are common in older people [3]. However, estimating the population prevalence of foot pain in older people is difficult, as several case definitions have been used which vary according to pain frequency and time period. Nevertheless, a recent systematic review of 31 population-based studies involving 75,505 community-dwelling participants aged 45 years and over identified eight studies with comparable case definitions, from which a pooled prevalence estimate of frequent foot pain of 24% was derived. Frequent foot pain was found to most commonly affect the forefoot and the toes, to be more prevalent in women than men, and to be at least moderately disabling in two-thirds of cases [4]. Two prospective studies also indicate that foot pain is highly persistent in older people. A prospective study of 2718 people aged 50 years and over reported that of those who reported disabling foot pain at baseline, 72% had foot pain three years later, with women more likely to report persistent foot pain than men [5]. Similarly, a study of 4745 women aged 70–75 years reported that foot pain persisted in 51% over a six year follow-up period [6].

3.2. Risk factors

Cross-sectional studies have identified several potential risk factors for foot pain in older people, including female sex [7–9], obesity [8,10,11], depression [12–14] and comorbidities such as diabetes and osteoarthritis [15–17]. Of these factors, female sex and obesity appear to have the strongest associations with foot pain. Older women are significantly more likely to report foot pain than older men, which may be due to the higher prevalence of hallux valgus and lesser toe deformities [18,19] and the influence of women's footwear, which frequently incorporates an elevated heel and narrow toe box [20,21]. The association between increased body mass index and foot pain in older people has been attributed to increased mechanical loading of the foot when walking [22] and the contribution of metabolic factors associated with excess fat mass [23].

Despite the general consensus that health status is strongly linked to socio-demographic factors, the role of education and income in the prevalence of foot pain in older people is equivocal. While some studies have reported that older people with foot problems have a lower level of income [24] others have failed to find such an association [17,25]. Similarly, lower levels of education have been found to be associated with foot problems in some studies [17,24] but not others [15,16,25]. These discrepancies are likely to reflect differences in how income levels are defined and differences in educational systems between countries.

3.3. Common foot disorders in older people

Foot pain is a complex phenomenon as it may be caused by local factors (i.e. structural disorders affecting the load-bearing function of the foot) and systemic factors (i.e. dermatological, vascular, neurological and musculoskeletal conditions that may manifest in the foot). A detailed evaluation of each of these conditions is beyond the scope of this review. However, large-scale epidemiology studies indicate that the most commonly observed and reported foot disorders resulting in foot pain in older people are keratotic lesions (corns and calluses), followed closely by nail disorders (particularly fungal nail infection) and structural deformities such as hallux valgus ('bunions') and lesser toe deformities (hammertoes and clawtoes) [7,18,26]. Systemic conditions most commonly associated with foot symptoms in older people include osteoarthritis [27], rheumatoid arthritis [28], gout [29] and diabetes [30]. Given that local and systemic factors often coexist, delineating a precise cause of foot pain in older people is difficult and requires a detailed systems examination in clinical practice.

4. Impact of foot pain in older people

There is strong evidence that foot pain has a significant detrimental impact on mobility and health status in older people. Several studies have demonstrated that foot pain is associated with reduced walking speed [31,32] and difficulty performing activities of daily living [16,31–34]. The majority of older people with foot pain consider it to adversely affect their ambulation on most days [4] and 20% specifically report foot pain to be the primary cause of their inability to leave their home [35]. Foot pain has also been shown to be associated with impaired balance [36,37] and is an independent risk factor for accidental falls [38,39]. More broadly, older people with foot pain report poorer health-related quality of life, as evidenced by lower scores on the Short Form 36 health survey [13,25,32].

Management of foot pain in older people accounts for a substantial number of consultations to health professionals. In the UK, primary care consultations for musculoskeletal foot and ankle problems are strongly associated with age, and peak in the 65–74 year age group [40]. Similarly, podiatry utilisation in Australia is highest among those aged 65 years and over [41], with older people accounting for 75% of all publicly-funded podiatry consultations [42]. Many older people also seek surgical intervention for their foot pain, particularly for conditions affecting the forefoot and toes [43].

5. Management of foot pain in older people

5.1. Routine foot care

The provision of foot health services to manage foot pain and disability in older people is primarily the domain of the podiatry profession, although a wide range of health professionals (such as general practitioners, rheumatologists, orthopaedic surgeons, nurses, physiotherapists and pedorthists) may also contribute [44]. Maintenance of foot hygiene and treatment of toenails and keratotic lesions in older people accounts for a substantial proportion of a podiatrist's workload. Clinical audits have shown that regular podiatry treatment can maintain or improve foot health in older people [45] and that discharge from podiatry services may result in a subsequent deterioration in foot health and mobility in this age-group [46].

Difficulty cutting toenails is common in older people, as it requires not only adequate joint flexibility, but also a high level of manual dexterity and visual acuity; all of which may decline with

age. Although often considered to be relatively trivial problems, nail disorders resulting from inability to maintain toenail hygiene, such as onychomycosis (fungal nail infection) and onychocryptosis (ingrown toenails) can be extremely painful and disabling [47]. In hospital or residential care settings where podiatry services are limited or unavailable, nursing staff may be required to perform this role [48]. Although there is evidence that nursing staff lack confidence in managing foot problems [49,50], educational interventions to train nursing staff have been shown to be effective at improving both foot care knowledge and practices [51,52].

Management of painful plantar calluses commonly involves scalpel debridement by a podiatrist, although the effectiveness of this approach is uncertain. Although uncontrolled studies have reported immediate reductions in pain following scalpel treatment of plantar calluses [53,54], controlled trials involving a 'sham' treatment group suggest that this apparent short-term improvement can be largely attributed to placebo effects [55,56]. However, these findings do not preclude the possibility of cumulative benefits over a longer time period. A recent trial has shown that scalpel debridement of plantar calluses is more effective at improving the mechanical properties of the skin than the application of topical keratolytic agents [57]. This effect may be particularly important in the management of the older person with diabetes, as regular scalpel debridement of plantar calluses has been shown to be effective in the prevention of neuropathic ulceration [58].

Treatment of corns may also require scalpel debridement, however a recent randomised trial suggests that corn plasters containing 40% salicylic acid may be more effective [59]. In this trial, 202 people were randomised to receive either scalpel debridement or corn plasters, and were followed up for a 12 month period. The use of corn plasters was associated with a higher proportion of resolved corns, a prolonged time to corn recurrence, less pain and reduced corn size over the first 6 months in comparison with scalpel treatment. However, this treatment needs to be very carefully considered in older people with poor skin integrity or peripheral neuropathy, as several cases of foot ulceration associated with corn plasters have been reported in people with diabetes [60].

5.2. Footwear considerations

Evaluation of footwear is one of the most fundamental components of effective management of foot pain in older people. Between 26 and 50% of older people wear shoes that are too short or too narrow [61–63] due to fashion influences [64,65], not measuring foot dimensions when purchasing shoes [66], and the limited availability of footwear that caters for the altered shape of the older foot [67,68]. In older people, wearing shoes substantially narrower than the foot is associated with corns on the toes, hallux valgus deformity and foot pain, whereas wearing shoes shorter than the foot is associated with lesser toe deformity [69]. Furthermore, shoes that are too tight in the forefoot or too loose in the heel may lead to reduced walking speed and gait instability [70].

The detrimental effect of high heels has been examined in two recent reviews [71,72]. Heel elevation alters the position and motion of the foot and ankle, thereby altering the biomechanics of the knee, hip and spine and predisposing to musculoskeletal pain. However, there is some evidence that the use of high heels diminishes with age. A survey of 2627 women aged 50 years and over found that the use of high heels was common between the ages of 20–29, but declined to less than 10% by the age of 40 years [73]. This may be indicative of a life-course trajectory in which the influence and perceived importance of fashion diminishes over time and is replaced with a greater emphasis on comfort and practicality. Nevertheless, in older people who continue to wear this style of footwear, heel elevation is associated with hallux valgus and plan-

tar calluses [69] and has been shown to impair balance and increase the risk of falls [74].

Given the association between suboptimal footwear and foot pain, changing footwear could be a simple and effective intervention. Indeed, a recent randomised trial has shown that the use of appropriate footwear is effective at reducing foot pain in older people [75]. In this study, community-dwelling older people with disabling foot pain were randomly allocated to an intervention group (who received off-the-shelf, extra-depth footwear with a compliant elastane upper) or a usual care control group. At the 4 month follow-up period, the intervention group exhibited a greater reduction in foot pain and developed fewer keratotic lesions than the control group, suggesting that simply changing footwear may be an effective management strategy. However, fashion influences are a significant barrier to adherence, particularly in older women, as selection of footwear is more strongly influenced by aesthetics than functional considerations [76].

5.3. Foot orthoses

Foot orthoses are devices placed inside the shoe that alter the timing and magnitude of the forces acting on the foot during weight bearing activities. Orthotic therapy plays a major role in the conservative management of foot disorders in older people [77,78]. In the UK National Health Service, it has been estimated that £38 million is spent on orthoses each year, with foot orthoses accounting for 75% of a hospital's total appliances budget [79]. Foot orthoses range from simple adhesive pads that can be manufactured during a routine consultation, through to more complex techniques involving the construction of custom-moulded insoles derived from plaster casts or 3-dimensional scans of the older person's feet.

Several studies have demonstrated that foot orthoses are effective at reducing pressure from painful regions of the foot (including the heel [80], forefoot [81] and toes [82]) in older people, and may also be beneficial for balance [83–85]. In relation to symptoms, two uncontrolled studies have suggested that foot orthoses can reduce foot pain in older people [85,86], and one randomised controlled trial found that foot orthoses with a medial arch support and metatarsal pad were effective at reducing foot pain and foot-related disability in older women with osteoporosis [87]. More recently, two randomised trials found that foot orthoses were effective at reducing symptoms in people with osteoarthritis of the first metatarsophalangeal joint [88] and midfoot joints [89]. These studies suggest that foot orthoses may be a useful conservative treatment for a range of foot disorders in older people. However, when prescribing orthoses in this age-group, consideration also needs to be given to whether the older person has suitable accommodative footwear, sufficient mobility to change or remove the orthoses when necessary, and sufficient skin integrity to withstand the arch contouring provided by the devices.

6. Summary and conclusions

Foot pain affects at least one in four older people, is frequently disabling, and is associated with mobility impairment and falls in this age group. The major risk factors for the development of foot pain are increasing age, female sex, obesity, depression and common chronic conditions such as diabetes and osteoarthritis, while the most commonly reported foot disorders by older people are corns and calluses, nail disorders and toe deformities. Management of foot pain is primarily the role of the podiatrist, although nurses, general practitioners, rheumatologists and orthopaedic surgeons may contribute. Conservative podiatric interventions such as regular foot care, footwear advice and foot orthoses appear to be effective at reducing foot pain in this age group, although further

controlled trials are required to adequately evaluate their effectiveness.

Conflict of interest

HBM has no conflict of interest to declare.

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Contributor

HBM is the sole author of this review.

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